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A JOINT ISSUE: THE CHALLENGE OF SYNCHRONIZING FIREPOWER AT THE OPERATION LEVEL

A Monograph
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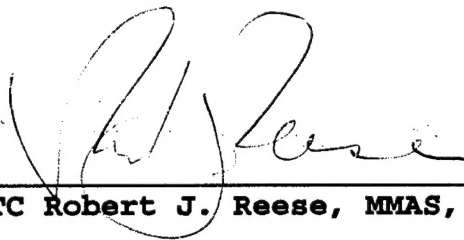
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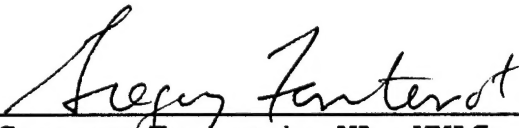
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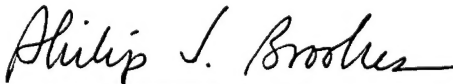
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ABSTRACT

A JOINT ISSUE: THE CHALLENGE OF SYNCHRONIZING FIREPOWER AT THE OPERATIONAL LEVEL by MAJ Allen W. Batschelet, USA, 53 pages

This study examines the current Army, Air Force, and joint doctrines' impact on the Army's aim of simultaneous attack of an enemy in depth. The research shows that no joint planning or execution occurs between the Land and Air Component Commanders. This results in the development and execution of separate land and air operations without achieving the desired effects of synchronized operations and inhibits the Army from attacking enemy forces simultaneously throughout their depth.

Analysis of the current doctrine included an examination of US air and land synchronization doctrine used in World War II. This examination identifies the functions executed by the land and air components in World War II that led to successful operational level land and air force synchronization. Using the determined criteria, this study evaluates the current joint doctrine's ability to synchronize land and air component operations and achieve the Army's goal of simultaneously attacking enemy forces throughout their depth.

The current doctrine contains a major weakness. It requires the land component commander to synchronize all effects of weapon systems within his assigned AO without providing the tools necessary to effect that synchronization. Specifically, the land component commander is able only to *nominate* for attack, air interdiction targets within his AO to the air component commander. Effective synchronization within the land component commander's AO demands that he have the authority to determine the timing, priority, and effects of air delivered interdiction.

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SECTION 1

Background

In the mid 1980s, pressure mounted in the United States Congress to reform the Department of Defense (DOD). Advocates of reform demanded that the US armed forces focus on conducting effective unified operations. In 1985, Senator Barry Goldwater, then a Republican Senator from Arizona, addressed Congress on the need to improve the Department of Defense:

The inability of the military Services to work together effectively has not gone unnoticed. Attempts have been made in the past to correct this problem, but it is still with us. It is still extremely detrimental to our Nation's ability to adequately defend ourselves. As someone who has devoted his entire life to the military, I am saddened that the Services are still unable to put national interest above parochial interest.

The problem is twofold; first, there is the lack of true unity of command, and second, there is inadequate cooperation among US military Services when called upon to perform joint operations.¹

With the subsequent passage of the Goldwater-Nichols Act in 1986, the United States' military began an organizational transformation that would result in joint operations being the rule, rather than the exception.²

The past decade has seen the armed services, especially the Army and Air Force, continue their evolutionary struggle to develop an effective joint warfighting doctrine. Both the Army and the Air Force, parochialism aside, continue in their search to produce a joint doctrine that reflects the current influences on the nature of war. These influences include technology, intellectual reflections on warfighting, and the anticipated environment

of conflict. The Army intensified the debate between the services when it published two doctrinal statements: FM 100-5, Operations, in June of 1993 and TRADOC PAM 525-5, Force XXI Operations in August 1994. This controversy concerns the two services' abilities to synchronize their respective capabilities at the operational level of war. Moreover, it affects how the Army and Air Force envision performing functions that were once service unique and easily delineated, but are becoming increasingly blurred. This study focuses on Army, Air Force, and joint doctrine, and the organizational structure designed to synchronize land and air forces at the operational level of war. Further, it discusses the effects of current doctrine and organization and the Army's ability to achieve its aim of simultaneously attacking enemy formations throughout the depth of the battlefield.

Significance of the Problem

In a foreword to Joint Pub 1, Joint Warfare of the US Armed Forces, Chairman of the Joint Chiefs of Staff, General Colin Powell (Ret) wrote:

The nature of modern warfare demands that we fight as a team. This does not mean that all forces will be equally represented in each operation. Joint force commanders choose the capabilities they need from the air, land, sea, space, and special operations forces at their disposal. The resulting team provides joint force commanders the ability to apply overwhelming force from different dimensions and directions to shock, disrupt, and defeat opponents. Effectively integrated joint forces expose no weak points or seams to enemy action, while they rapidly and efficiently find and attack enemy weak points. Joint warfare is essential to victory.³

Land component commanders operating, in future power projection environments, will confront enemies equipped with a wide spectrum of weapons. Potential opponents can field large armored units accompanied by long range artillery and air support. Easily

³This paper will use the TRADOC PAM 525-5 convention of referring to this concept as "depth and simultaneous attack."

acquired and increasingly available off-the-shelf communications equipment, tied to reconnaissance, intelligence, surveillance, and target acquisition systems, will enable adversaries to employ forces that constitute a significant threat to US national security.⁴

The Army's ability to engage and affect the battlefield at operational depths is a new and increasingly contentious issue between the Army and Air Force. The Army's Apache attack helicopter and Army Tactical Missile System (ATACMS) can reach targets at operational depths in excess of 100 kilometers. This ability, coupled with the promulgation of FM 100-5, Operations in 1993 adds a new dimension to joint operational level warfare. It conceptually extends the Army's reach into a portion of the battlefield previously considered by the Air Force to be its exclusive responsibility. Moreover, this new Army ability raises the question of who should be responsible for planning, targeting, delivering, and synchronizing effects of operational level weapon systems.

If the Army is to achieve its aim, it must work with the other services, but primarily the Air Force, to develop a joint doctrine of operational effects synchronization. The result must be a joint doctrine that does not sacrifice either service's functional effectiveness, but results in a synergistic warfighting philosophy. Because the Army receives its air support from the Air Force, this study limits its focus to the interface between those two services.

Methodology

This study will evaluate the research question by comparative analysis. The analytical measure of effectiveness is the joint doctrine and joint organization's ability to achieve the Army's aim of depth and simultaneous attack. Initially, examination will determine the organization and doctrine that the United States' developed and implemented in World War II to synchronize land and air forces during the breakout from

Normandy. This examination will identify the functions executed by the Army and Army Air Force that led to successful operational level land and air forces synchronization during the Normandy operation. Using these criteria, this study will evaluate the current joint doctrine and organization's ability to synchronize successfully land and air forces and achieve the Army's new doctrinal aims.

SECTION 2

Theoretical Foundation of Depth and Simultaneous Attack

Attacking the enemy simultaneously, throughout the depth of his formation is not a new idea.⁵ Two Soviet theorists, Mikhail Tukachevskii and Vladimir Triandafillov originated the concept of depth and simultaneous attack at the operational level of warfighting. In 1924, Marshal Mikhail Tukhachevskii presented a paper to the Red Army All-Union Artillery Conference titled, Maneuver and Artillery. Results of this conference led to the publication of the Red Army's 1936 Field Regulations that emphasized depth of operations and indirectly, simultaneous attack.⁶ Even in 1936, when air power was in still in its infancy, Tukachevskii recognized its importance and the need to synchronize land and air power effects. In the first chapter of the 1936 Regulations, Tukachevskii wrote:

Maneuver and offensive operations by mechanized formations require air support. Air formations, as well as carrying out independent operations, act in close conjunction with all-arms formations at operational and tactical levels. They undertake measures against enemy columns, troop concentrations and support elements (ground attack aircraft and light bombers); bridges; (bombers), and enemy aircraft and airfields (fighters, ground attack aircraft, and light bombers). They also cover friendly forces and dispositions.⁷

Tukachevskii's theory of operational level warfare manifests itself in current US joint and service doctrine.

Current Joint and Service Operational Doctrine

Joint Pub 3-03, Joint Interdiction Operations reflects the maturation of Tukachevskii's operational theory. Joint force commanders incur unique advantages over their enemies when they combine force capabilities and operations into concentrated effort. Typically, these advantages include enhancing exploitation of tactical events, avoiding duplication of effort, and increasing the tempo of combat operations.⁸ Moreover, joint doctrine recognizes the requirement for depth and simultaneous attack. Joint Pub 3-03 requires the sustained and simultaneous attack of the enemy in depth, with the implicit intent of overwhelming the enemy's ability to respond effectively.⁹ Respective service doctrine also recognizes the importance of this doctrine.

While focusing on air power and its decisiveness, Air Force Manual 1-1, Basic Aerospace Doctrine emphasizes the complementary, yet divided action of land and air forces. Synchronized land and air operations presents the enemy commander with a dilemma, one in which he is unable to react effectively to the combined impact of land and air forces. Air interdiction's ability to delay and disrupt the enemy in depth, in concert with land forces, compels opponent commanders to react to friendly initiatives and reduces his available options.¹⁰ Unlike the Air Force, the Army has only recently acknowledged the value of both depth and simultaneous engagements in its doctrine, or had the necessary tools to execute this vision.

Since the publication of the 1982 edition of FM 100-5, Operations and the creation of AirLand Battle doctrine, the Army has stressed increasingly the importance of attacking enemy forces in depth. The 1993 version of Operations codifies attack of the enemy in depth and simultaneously and introduces the concept of battle space.¹¹ The Training and Doctrine Command's 525-200 series of Pamphlets expands and refines the battle space

construct. This concept is critical to employing the battle dynamic of depth and simultaneous attack.

Successful commanders have always employed the concept of battle space. Only the label is new. Battle space is a way to think about fighting--a visualization by commanders at every level of the entire battlefield and all phases of the campaign and operation. Commanders must be able to maneuver forces, rapidly apply overwhelming firepower, and see the enemy throughout the depths of the battlefield.¹² This holistic mental visualization of the battlefield, coupled with the ability to "see" the enemy in depth, enables commanders to shape the battlefield by simultaneously massing effects in depth.

When viewed within the construct of battle space, simultaneous attack of the enemy in depth, suggests a battlefield without boundaries or virtual control measures. The battle dynamic of depth and simultaneous attack creates opportunities to extend the battlefield in space, time, and purpose. In the defense, engaging the enemy before he closes on friendly positions has long been a desired aim. Conversely, the goal of the offensive, attacking the opponent early and at long range, reduces the cohesion of the enemy's defense and facilitates seizure of terrain and destruction of enemy forces. By accurately attacking with massed effects, the commander extends the effects of decisive close combat. Furthermore, commanders can maneuver this combat power to the decisive place and time on an extended, seamless battlefield.¹³

Joint doctrine and the Army's emerging expertise at the operational level of war, convey the requirement to develop joint procedures that synchronize effectively land and air component functional capabilities. The true nature of joint operations is full synchronization and integration of combat power. In a recent article, Army Chief of Staff, General Gordon R. Sullivan emphasized the importance of joint synchronization:

Each service brings to the battlefield unique capabilities that when applied in seamless complementary fashion generate a powerful synergy. The army contributes significantly to this synergy and also derives great benefit from the contributions of the other services.¹⁴

As the services continue to develop joint doctrine and organizations, it is critical to assess continually their effectiveness. Determining criteria for success is often difficult. However, for land and air force synchronization, an example of success is found in operations conducted by US forces in World War II. Evaluation of the following historical case study will produce criteria that define success, against which current joint land and air synchronization doctrine and organization effectiveness can be measured.

SECTION 3

World War II Development of Joint Air/Land Doctrine

First, this section will examine the development of joint land and air synchronization doctrine in North Africa during World War II. Because of British experience in North Africa, the US Army published FM 100-20, Command and Employment of Air Power. This seminal publication established the principle that land and air forces are simultaneously coequal and interdependent.¹⁵ Second, this section will determine the criteria that produced effective synchronization of land and air force's capabilities in the European Theater of Operations during 1944-1945.

North African Campaign

Before the invasion of North Africa, during Operation Torch, US Army Air Forces were split into three components.¹⁶ Army Air Forces operated according to the doctrine found in FM 1-5, Employment of Aviation of the Army, that dictated the requirements of the land commander determined the objectives for air forces.¹⁷ Doctrinally, aviation was an asset employed by the land commander. Land forces had attached Army Air Force

units to simplify command and control. The underlying concept envisioned the employment of air power in support of land forces, much like the relationship between armor, infantry and the field artillery. Other doctrinal publications reinforced this idea.¹⁸

Following Operation Torch and the invasion of North Africa, weaknesses in land and air forces synchronization became evident.¹⁹ Initially, an air support command aligned with either a field army or corps.²⁰ A typical arrangement in the North African theater attached the Army Air Force's XII Air Support Command to the Army's II Corps. This example explains how, doctrinally, Air Support Commands answered to the land force commander. This relationship, normally found at the corps level or higher, enabled the land force commander to exercise his authority on how best to employ air assets, including targeting priorities.²¹ Unexpectedly, Army commanders began to realize by early 1943 a necessity to change land and air synchronization doctrine. Due to the lack of a centralized, coordinated effort to achieve air superiority, land commanders employed air power everywhere and concentrated effectively nowhere. The result was a subordination of operational level objectives to maximize tactical level land and air synchronization.

In early 1943, British forces were busy developing a more effective doctrine intended to synchronize land and air forces' capabilities. Before US arrival in North Africa, the British experience of fighting the Axis powers demonstrated inherent flaws in British armed forces doctrine. After the fall and subsequent capture of Tobruk by German forces in 1942, a US observer, Colonel Bonner Fellers sent a report to the US War Department regarding the British VIIIth Army:

With numerically superior forces, tanks, aircraft, artillery, and transports, reserves of all classes, the British Army has twice failed to defeat the Axis in Libya. Its tactical conceptions were constantly faulty; it neglected completely the use of combined arms. The only remaining certain and effective method of destroying Rommel is to unify Air and Army

commands, to reorganize the VIIIth Army under new leadership and new methods.²²

Colonel Feller's observations proved astute and the British reorganized their VIIIth Army under new leadership. On 13 August 1942 Bernard Montgomery accepted command of the VIIIth British Army. Shortly after assuming command Montgomery instituted a series of organizational and doctrinal changes, including how land and air forces would relate to each other in the future. The effectiveness of Montgomery's changes became evident in January of 1943 when the British VIIIth Army culminated its drive to Tripoli. Air Vice Marshall Sir Arthur Coningham, played a significant part in VIIIth Army's success.²³

Coningham asserted that the Army and Air Force must work together to synchronize their capabilities and concentrate decisive combat power at the critical time and place. Under the leadership provided by Coningham the Royal Air Force defeated the German Air Force and continued to provide close air support to the British VIIIth Army. From its inception in 1918, unlike the US Army Air Force, the Royal Air Force had been an independent force. This influenced Coningham to view army and air forces as coequal, but interdependent. Coningham and Montgomery exploited the inherent power of this concept into an operationally effective joint doctrine.²⁴

Two significant events occurred during January of 1943 that effected significantly the future doctrinal development and employment of land and air force synchronization. First, at the Casablanca Conference, President Roosevelt and Prime Minister Churchill agreed on the reorganization of air power in the Mediterranean Theater. Second, Montgomery held a conference at Tripoli. During this meeting, Montgomery gave his subordinates a pamphlet containing his thoughts about joint warfare titled, Some Notes on High Command in War. In combination, these events laid the foundation for the

publication of the United States Army's FM 100-20, Command and Employment of Air Power.²⁵

Two reasons appeared to motivate British desires for air power reorganization. In keeping with their views on the employment of air power, the British wanted the US XII Air Support Command under the command of their Theater Air Commander, not under the command of the American Corps Commander. Moreover, there were serious demonstrable weaknesses in the land and air synchronization doctrine then in use. The British convinced the US to institute the proposed changes, producing a reorganized command and control structure.

Air Vice Marshall Sir Arthur Coningham was the new commander of the reorganized Northwest Africa Tactical Air Force. This reorganization made him coequal with the recently reconstructed 18th Army Group. Restructuring of the 18th Army Group subordinated all land forces, including the British First and Eighth Armies, American II Corps and French XIX Corps, under the command of a Theater Land Component Commander.²⁶ Alignment of land to air forces associated, coequally, the XII Air Support Command with the US II and French XIX Corps, the Desert Air Force with the British Eighth Army, and the 242 Group with the British First Army.²⁷ Moreover, the interface between the army and air forces was at the tactical air force - field army level, equating to the operational level of war.²⁸ Above the army level, commanders focused on theater campaign strategy while commanders at the tactical air force/army level turned broad theater strategic goals into specific operational objectives.²⁹

An American officer, Brigadier General L.S. Kuter, had responsibility for translating the successful British land and air force synchronization doctrine into US doctrine.³⁰ Kuter distilled US experience in North Africa and identified problems with US

Army Air Force doctrine. Further, Kuter outlined Montgomery's doctrine and why it worked, following the January 1943 reorganization of British Air Forces in the North African Theater. In his final report to the commander of US Army Air Forces, Kuter described how American air unit organization and command relationships had been ineffective due to the decentralized nature of control. He also wrote that after the US Army Air Force's reorganization, under the British model, combat effectiveness increased significantly. A doctrine recognizing coequal and interdependent Army Air Forces, centrally commanded and controlled, emerged as most effective when compared to decentralized control of Army Air Forces.³¹

Field Manual 100-20, Command and Employment of Air Power

The Air Force, according to AFM 1-1, Basic Aerospace Doctrine, extols FM 100-20 as its "Declaration of Independence." From its inception, when Army General McNair initially objected, the doctrine espoused by the Army Air Force proved contentious.³² Central to the Army dissatisfaction, was the belief that a doctrine of centralized control of air assets under an air commander would inhibit the Army's ability to mass land and air power, at the decisive point, as determined by the land force commander.³³

Essentially, Army commanders believed that they would not have control over air power when and where they needed it to support land actions because air commanders would be focusing exclusively on the air war.³⁴ Conversely, air commanders worried that land force commanders would decentralize air assets making it difficult to gain air superiority or mass air power in support of land operations.³⁵ The reason joint doctrine evolved to its present state is due in large part to the air proponents winning the argument based on US experience in North Africa.

As previously discussed, FM 100-20 established the tenet that land and air forces are coequal and interdependent. This was a significant departure from previously accepted doctrine. Moreover, FM 100-20 instituted the maxim that "command of air and land forces in a theater of operations rests with the superior commander charged with the actual conduct of operations in the theater. This commander will exercise command of air forces through the air force commander and command of land forces through the land force commander."³⁶

Lastly, promulgation of FM 100-20 codified four major conceptual ideas and prioritized, generally, air power efforts. Conceptually, air power's effective employment required:

1. All that is required is that the two staffs, army and air, should work together at the same headquarters in complete harmony, and with complete mutual understanding and confidence.
2. The commander of an army in the field should have an Air Headquarters with him, which will have direct control and command of such squadrons as may be allotted for operations in support of his army.
3. But through his Air Headquarters, the Army commander can obtain the support of the whole air striking force in the theater of operations, because of the flexibility of air power.
4. It follows that they must centralize control of the available air power, and they must exercise command through Army Air Force channels.³⁷

Generally, Priority of air power effort was to be:

1. To gain air superiority.
2. To prevent movement of troops and supplies into and within a theater.
3. To participate in a combined effort of land and air forces.

After a shaky beginning in North Africa and significant restructuring and reorganization, the Army and Army Air Corps would test and refine their new doctrine in Sicily and Italy before invading the European continent.

European Theater and Operation Cobra

The US implemented the new doctrine of land and air force synchronization, developed in North Africa, in the European Theater.³⁸ Before execution of "Operation Overlord," in June of 1944, a refined land and air synchronization doctrine was in place. Numbered Tactical Air Commands aligned with Field Armies and numbered Air Forces with Army Groups. The US Ninth Air Force worked with the 12 Army Group. Subordinate units included the IX Tactical Air Command, associated with the First US Army and the XIX Tactical Air Command aligned with the Third US Army. Additionally, the XXIX Tactical Air Command fought with the Ninth US Army. See Appendix A for Command and Control Structure.³⁹ This organizational structure facilitated joint operational planning and execution.

Flexibility was the watchword of this command and control design. As Army requirements changed, Tactical Air Commands could shift forces between the armies. Tactical Air Commands met operational requirements with attached Fighter Bomber Groups. This system permitted Air Force Commanders to concentrate air power in support of operational objectives.⁴⁰ The true effectiveness of this system became apparent during the breakout from the hedgerows of Normandy during "Operation Cobra."

Operation Cobra

Stalemated in Normandy thirty days after the invasion, General Bradley planned an attack oriented on St. Lo with the objective of staging for a breakout from the Cotentin Peninsula hedgerows.⁴¹ By 18 July 1944, Bradley's forces had captured St. Lo and were preparing to begin "Operation Cobra," the breakout. The principal architects of "Operation Cobra" were Bradley, Lieutenant General Lesley J. McNair, First Army commander, and Major General Lawton Collins, commander of the VII Corps. Planning concurrently and

jointly with the land commanders was Major General Elwood R. "Pete" Quesda commander of the IX Tactical Air Command.⁴²

Planning for "Cobra" synchronized tactical land and air objectives with operational level objectives. Bradley and McNair selected the VII Corps to make the main attack with supporting flank attacks by the VIII and XIX Corps. Bradley reduced the VII Corps front to 7000 yards to ensure the success of the initial penetration of German defenses. Following the initial breakthrough by four divisions, the 1st Infantry, along with the 2nd and 3rd Armored divisions would conduct a passage of lines and exploit southwest into the Brittany Peninsula.⁴³

Army and Army Air Force planners developed a unique plan to capitalize on the large numbers of aircraft available for the operation. More than 2900 aircraft from the Ninth, with assistance from the Eighth Air Force, provided extensive air power effects along a 1450 yard front, essentially carpet bombing. More than 700 fighter bombers in two waves were to attack shallow targets, while 1800 heavy bombers attacked targets out to 2500 yards. Additionally, 400 medium bombers attacked deep operational targets ten minutes after land forces crossed the line of departure. These numbers included all of the Ninth's medium bombers and fighters and all of the Eighth's heavy bombers. The VIII Fighter Command provided air cover for the operation.

On the 25th, after a delay of five days due to poor weather, US land forces began the attack.⁴⁴ Initially land forces advanced slowly, but by the 28th, with the Germans in full retreat Bradley ordered full exploitation. The synchronized effects of land and air forces stunned the German defenders. Disorganized, the defenders lost their ability to command and control effectively. German commanders were unable to commit available reserves to reinforce front line units. On the 1st of August, Lieutenant General George

Patton assumed command of Third Army. Patton used the VIII and XIX Corps to begin moving south in an attempt to widen the penetration in the German lines, followed by a westward movement into Brittany.⁴⁵

"Operation Cobra" was a watershed for close cooperation between US land and air forces. The Ninth Tactical Air Command provided the tactical support required by elements of the First Army responsible for making the penetration of the German lines. Key to the success of the operation at the tactical level was the collocation of the IX Tactical Air Command and First Army Headquarters. Moreover, successful synchronization of land and air force plans at the operational level was due to the collocation of the headquarters of the 12th Army Group and Ninth Air Force. While the Army and Army Air Force collocated these tactical and operational level headquarters, they did not combine them. Army and Air Force commanders and staffs developed plans concurrently and together and further synchronized those plans at daily commander's conferences. This command structure enabled the Ninth Air Force to use its IX Bomber Command to interdict targets at operational depth according to the priorities established by the commander of the land forces. Successful attack of operational level targets prevented the Germans from moving reinforcements, equipment, and supplies forward to join in the fight.

The synchronized effects of the land and air attack devastated the German defenders. General Bayerlein of the Panzer Lehr Division said:

The planes kept coming, my front lines looked like a moonscape and at least 70% of my personnel were out of action. All my front line tanks were knocked out and we could do nothing but retreat. When a new SS Tank Battalion was dispatched to us with 60 tanks they arrived with only five.⁴⁶

Synchronization of land and air power facilitated the operational maneuver as the land forces broke off St. Lo. Moreover, airpower interdicted the German's ability to react

effectively to the US forces attack. During "Operation Cobra" land and air forces planned together at the tactical and operational level (army group, army, numbered air force, and tactical air command).

"Operation Cobra" is the definitive example of successful land and air force synchronization. The Allied breakout and exploitation offers an example of the effectiveness of attacking the enemy in depth and simultaneously. Moreover, the operation reveals how the linkage between tactical and operational objectives leads to the accomplishment of a strategic goal within a theater. There would have been no operational level maneuver without the synchronization of land and air force's effects. Land forces could have conducted operations at the tactical level without synchronizing with air forces. However, the German defenders, free from the simultaneous threat of air attack, would have been able to employ reserves to counter tactical land force maneuvers and limit the breakout attempt. Operational level air attacks, combined with the effects of tactical operations, overwhelmed the German defenders and set the stage for the subsequent exploitation of an enemy no longer able to command or control his forces effectively. Essentially, US forces achieved the effects of the modern battle dynamic of depth and simultaneous attack. Bradley was able to influence directly the Germans throughout what we call today "battle space" and achieve the decisive effects of concentrated combat power.

Criteria for Successful Air and Land Force Synchronization

Ineffective land and air synchronization operations conducted in the North African Theater forced an evaluation and eventual redesign of doctrine. The initial impetus for restructuring grew out of the recognition that land force success depended on the protection afforded by air superiority. This issue motivated the British to redesign their

doctrine to capitalize on the flexibility of air power. The inherent ability of air power to concentrate effects quickly throughout the battlefield was its greatest strength. With the promulgation of FM 100-20, US forces instituted a land and air synchronization doctrine that would prove effective in future operations. Army commanders had an institutionalized, empirically proven doctrine designed to provide concentrated combat power in time and space to support an operational concept, much like that envisioned in the battle dynamic of depth and simultaneous attack.

Land and air forces invaded Europe with an organizational structure designed to exploit the newly developed doctrine. This organizational structure highlighted the primacy of joint planning and effective land-air communications systems. The primary reason for operational success, was the close planning relationship between Armies and Tactical Air Commands achieved by the collocation of headquarters and staffs. Centralized planning and coordination of land and air power at the operational level enabled army and air commanders to synchronize component combat power effects according to the guidance provided by higher headquarters. Redesigning the organizational structure overcame service parochialism and lack of coordination between land and air forces. Under the new structure, operational level army commanders gained the required protection of air superiority while enhancing their ability to concentrate air power decisively at the critical time and place. In sum, successful land and air synchronization resulted from:

1. Collocated headquarters at the operational level, resulting in a combined operations center jointly responsible for the planning and execution of operations.
2. The structure of land and air organizations supported the requirement to achieve air superiority while retaining the ability to concentrate and synchronize rapidly land and air combat force's effects.

3. A new awareness, cooperation and mutual appreciation for the capabilities of the respective land and air components and the results that they could attain through the synchronization two services abilities.

Today's land and air synchronization doctrine and organization has its roots in British and US World War II experience in North Africa and Europe. Practical experience resulted in the development of an effective land and air synchronization doctrine and organization.⁴⁷

SECTION 4

Current Joint Doctrine and Organization

Since World War II the Army and Air Force have gradually moved away from the doctrine and organization developed to fight that war. In 1948 the services split, began to focus on disparate interests, and began to pursue separate paths in their warfighting doctrines. However, the passage of the Goldwater-Nichols Act, changes in the international security environment, and the Army's expanding ability to effect the operational level of war, intensified the services' debate regarding their doctrinal and organizational relationships. The framework of this debate includes the requirement to develop a joint operational doctrine that enables commanders to synchronize at the decisive point, land and air forces in time, space, and purpose. This section describes current joint land and air synchronization organization and doctrine. Additionally, it evaluates the land and air synchronization organization and doctrine used during Operation Desert Storm. This section also evaluates that operation against the criteria determined in section three to be necessary for the successful synchronization of land and air forces.

Joint Synchronization Doctrine

Joint Pub 3-03, Joint Interdiction Operations is an attempt to strengthen the synchronization operations of joint forces and maximize their capabilities. The objective of joint interdiction is to divert, disrupt, delay, or destroy the enemy's surface military potential before it can be used effectively against friendly forces.⁴⁸ All interdiction operations support the Joint Force Commander's campaign plan. According to Joint Pub 3-03:

To have the greatest impact, the planning and conduct of interdiction operations must complement surface operations. Correspondingly, commanders of surface forces should consider how their capabilities and operations might complement interdiction in achieving the theater campaign objectives. Planning and conducting interdiction and surface operations within a coherent framework will enhance their synergistic effect.⁴⁹

This joint doctrinal statement acknowledges the historical tenet that land and air forces are coequal and interdependent. Moreover, it implies that when land and air forces conduct operations jointly, their efforts combined, are more effective than when conducted in isolation. Additionally, it suggests that land and air forces must plan their operations together, each considering, and leveraging the effects produced by the actions of the other.

Joint Doctrinal Responsibilities

Joint publications define in detail doctrinal relationships and responsibilities between land and air forces in a theater of operations. Commanders of combatant commands or joint task forces are designated the Joint Force Commander (JFC) and assigned responsibility to accomplish the missions and objectives of the joint force. To execute assigned missions, the JFC exercises operational command (OPCON) authority

over subordinates and is responsible for the apportionment of air assets and missions assigned to land forces.⁵⁰ The JFC translates strategic guidance into operational objectives and concepts. A subset of this translation is the JFC's establishment of the theater guidance and objectives for the operational interdiction campaign. Subordinate land component commanders and air component commanders *consult* with each other about proposed schemes of maneuver, priorities of air support and the air apportionment recommendation.⁵¹ Key to this relationship is the word consult.

The commander designated as the land component commander executes command of land forces assigned to the joint force. Normally, the land component commander is located at field army or corps level. A land component commander's responsibilities include:

1. Establishing priority of tactical air support to subordinate corps.
2. Providing a liaison to the air component commander by means of the Battlefield Coordination Element (BCE) to the air component commander's Air Operations Center (AOC).
3. Nominating operational level interdiction targets to the air component commander, designed to shape the battlefield in front of land forces.⁵²

Functions executed by the land component commander occur in an area of operations (AO) designated by the joint force commander. The size of this AO is established based on the land component commander's requirement for depth to maneuver rapidly and to fight at extended ranges. Within these AOs, land component commanders are designated the supported commander and are responsible for the synchronization of maneuver, fires, and interdiction. To facilitate this synchronization, such commanders designate the target priority, effects and timing of interdiction operations within their AOs.⁵³ The implication is, that to facilitate this synchronization the

land component commander must have control of the assets conducting interdiction operations.

The air component commander commands all assigned air forces of the joint force. Normally, the air component commander is located at numbered air force level.

An air component commander's responsibilities include:

1. Establishing the Air Operations Center (AOC) and internal to the AOC the Tactical Air Control Center (TACC).
2. Developing the air apportionment recommendation in coordination with the other component and supporting commanders and submitting this recommendation to the JFC for approval.
3. Planning and executing the air interdiction campaign plan.⁵⁴

The responsibilities assigned to the component commanders produce a disjointed doctrine. Because the land component commander, responsible for synchronizing operations in his AO, can only nominate operational level interdiction targets located in his AO to the air component commander, attack of operational level targets is inhibited. Furthermore, the air component commander has the authority to divert sorties from preplanned interdiction targets located in the land component commander's AO. Diversion of sorties requires only that the air component commander, through the BCE, inform the land Component Commander of the decision. This results in a joint doctrine at odds with itself by tasking the land component commander to conduct operations without providing the tools to enable him to do so.

The current joint doctrinal relationship between the land component commander and air component commander establishes a conceptual seam at the operational level between the two forces. This seam undermines the Army's concept of a seamless battle space and ensures a disjointed attack of the enemy throughout his depth. Strengthening this seam is of primary concern to the Army and Air Force because seams are inherently

weak and present enemy forces an exploitable vulnerability. Because Air Force doctrine views the battlefield as compartmentalized, an organization is needed to bridge the joint planning and execution seam between the two services. The BCE is the Army coordination organization serving as the army forces representative to the air component commander and is the Army's attempt to bridge this gap between the Army and Air Force.

BCE Organization and Operations

Because effective joint land and air force synchronization is not yet doctrinal, coordination must occur between the land and air forces in an attempt to synchronize attack of enemy forces simultaneously throughout his depth. Development and use of the BCE recognizes that the inability to synchronize creates a seam on the battlefield. The BCE is the organization established to reinforce and strengthen the synchronization seam and develop a common situational awareness of the battlefield between land and air forces.

The mission of the BCE is to facilitate the synchronization of land operations with air operations through coordination of air support and the exchange of operational and intelligence data. The BCE insures that the air component commander and AOC are aware of the land component commander's intent, scheme of maneuver, and requirements for air support. A specified task for the BCE is to improve the timely two-way exchange of operational information through face-to-face coordination during the Air Tasking Order (ATO) development cycle. Significantly, the BCE performs only a liaison function and does not plan or execute operations.⁵⁵

The BCE is a large organization performing a complex task. It consists of over 35 officers and men with their associated equipment including, communication and transportation assets and requires significant logistical support. This large investment in

manpower and equipment is necessary only because no joint planning occurs between the two services.

The BCE performs seven basic functions:

1. Provide an accurate and timely interpretation of the land battle to the air component commander.
2. Relay and interpret land component commander request for air support.
3. Facilitate exchange of operational and intelligence data.
4. Coordinate airspace requirements.
5. Integrate Air Defense Artillery (ADA) operations with the defensive air campaign.
6. Coordinate airlift support for land component commander operations.
7. Provide feedback on air operations to the land component commander.⁵⁶

BCE organization provides a corresponding section to the operational sections within the AOC to maintain a close and continuous liaison between land and air forces. Three divisions constitute the BCE including operations, plans, and land liaison, each serving a distinct function.

The Operations Division of the BCE is responsible for monitoring and interpreting the current land battle situation across the land component commander's area of operation. Three sections are internal to the operations division. The Fusion Section, collocated with the Combat Operations Intelligence Division of the AOC is responsible for providing the current land force intelligence picture to the AOC. It validates land force-nominated targets before attack. The section ensures timely processing of battle damage assessment to the land force headquarters and identifies new targets to attack. It also processes land force requests for immediate air reconnaissance and electronic warfare support. It does this by exchanging information with the Corps' targeting cell in the Corps' Main command post and the land component commander deep operations cell.

The Operations Section collocates with the AOC's combat operations division (COD). This section keeps the COD updated on land force operations. It monitors execution of the current air tasking order as it pertains to missions planned against land component commander nominated targets and coordinates changes that affect the current ATO such as diversions, cancellations of missions, and changes in the land forces current operations. The operations section assists in the coordination of surface-to-surface missile strikes beyond the fire support coordination line (FSCL).

The Air Defense Artillery and Army Airspace Management Section coordinates Army air defense and airspace activities with the AOC's Airspace Control Center. It exchanges information with the AOC, land component commander headquarters, corps and ADA headquarters and assists in the development of the airspace control order (ACO), the air defense plan and rules of engagement (ROE). It attempts deconfliction of airspace when firing the ATACMS and schedules preplanned ATACMS and Army fixed wing aircraft into the ATO.

The Plans Division of the BCE is primarily concerned with the synchronization of land battle planning with the tactical air support planning process for future operations. The Plans Division also consists of three sections. The Plans Section is located in the AOC Combat Plans Division. It provides to the AOC a current and projected picture of the friendly land situation and helps synchronize land and tactical air support activities. A primary function of this section is to relay, interpret and coordinate Army approved preplanned requests for air support. It assists in planning, coordinating, and synchronizing J-SEAD and EW operations.

The Intelligence Section works within the AOC Combat Intelligence Division. It coordinates with the land component commander G-2 Collection Management Sections

to obtain Army intelligence reports and facilitate the exchange of intelligence data. The sections also provides the Intelligence Production Branch with the enemy land order of battle, assists in proper interpretation of this information and target development, and validates land component commander nominated targets.

The Airlift Section coordinates airlift support at the Air Mobility Element. It is the point of contact for joint airlift operations for supported Army units. It advises the commander, airlift forces, and staff on all matters concerning land force operations and intelligence.

The third division consists of the Ground Liaison Officers (GLO) assigned to each air attack wing operations center. The GLO performs liaison between the Operations and Plans Divisions of the BCE and the wing operations center by providing an exchange of operations and intelligence information. GLO's provide Army expertise, brief pilots on the land situation, and debrief pilots upon return from missions. The GLO keeps the wing operations center informed on the land component commander's planning guidance, priorities and planned future operations.⁵⁷ See Appendix B for BCE synchronization with AOC.

Even when the BCE executes its functions flawlessly, it is difficult at best, to synchronize land and air force power effectively. The JFC determines what the air apportionment will be, based on a recommendation from the air component commander. The air component commander must consult, doctrinally, with the land component commander before submission of the recommendation. It is difficult for this consultation to occur in execution because the land component commander and air component commander are not collocated. It remains for the BCE to accomplish this coordination

and consultation and to convey the land component commander's recommendation for air asset apportionment.⁵⁸

Land force attack of interdiction targets also represents a significant challenge for the BCE. The land component commander recommends to the JFC which land forces to use in support of the operational and strategic air interdiction operations. The air component commander, like the land component commander when nominating interdiction targets to attack with air assets, recommends through the BCE which targets land forces should engage. Attack of interdiction targets by land forces requires the land component commander to coordinate with the air component commander through the BCE and possibly include the attack on the air tasking order. Development of isolated, separate land and air plans results because land and air forces do not collocate headquarters, and no means is available to conduct joint planning.

The interdiction planning process, as currently designed, limits the land component commander's ability to shape the battlefield in front of land forces and prevents simultaneous attack of the enemy throughout the depth of his forces. Land component commanders can only nominate operational level interdiction targets for consideration to the air component commander. Army commanders identify and prioritize targets through successive army commands to the BCE, where the air component commander considers them for possible engagement. Synchronization of land and air forces therefore, relies on consultation between the air component commander and land component commander with the air component commander having veto power over the land component commander. Significantly, land and air force synchronization and depth and simultaneous attack of the enemy, do not rely on joint planning and execution. Rather, it depends on the ability to achieve synchronization of two distinct and

disconnected plans developed in isolation, each attempting to defeat the enemy separately. Recent experience in Operation Desert Storm is illustrative of the effectiveness of current doctrine.

Doctrine in Execution

Operation Desert Storm's command structure reflected the experience of General H. Norman Schwarzkopf commander in chief of Central Command (CINCCENT) and the personalities of his subordinate commanders. Schwarzkopf chose to split command of the land forces between US Army Forces, Central Command (ARCENT) commanded by Lieutenant General Yeosock, and US Marine Forces, Central Command (MARCENT) commanded by Lieutenant General Walter E. Boomer. Lieutenant General Charles A. Horner commanded US Air Forces, Central Command (CENTAF) and was also dual-hatted as the Joint Force Air Component Commander (JFACC).⁵⁹ Schwarzkopf chose for many reasons, including lack of time, to be the land component commander and CINCCENT. From the Army's perspective, this command organization contributed subsequently, to an inability to synchronize land and air force operations at the operational level.

The ability to execute attacks simultaneously and in depth has a synergistic effect on enemy forces. During Operation Desert Storm this capability did not exist. Doctrinally, the BCE is the land component commander's liaison to the air component commander. In Operation Desert Storm however, the BCE served as ARCENT's representative to the air component commander. This resulted in the BCE becoming just another element competing for attention in the daily targeting meetings held by the air component commander.⁶⁰

Additional, problems stemmed from the non-doctrinal command and control structure that the BCE was forced to operate in. General Schwarzkopf, dual-hatted as CINCCENT and land component commander, devoted little time to the duties associated with being the land component commander. Nominally, Lieutenant General Waller, Deputy Commander in Chief CENTCOM (DCINC) was responsible for coordination of all land forces.⁶¹ Despite the presence of ARCENT as a numbered field army, it functioned more as a theater army, responsible for logistics and not warfighting.⁶² This produced a situation where no single unified voice advocated the position of the land forces to the JFACC and ensured that even land operations would not be synchronized.

Additionally, because the BCE was working for ARCENT, the Chief of the BCE Colonel David Shulte, was not invited to the daily meetings at CENTCOM. At these meetings, attended by the JFACC, Schwarzkopf would issue guidance about operational interdiction objectives. The JFACC would then execute based on directions received from the CINC, effectively bypassing the marginally useful consultation of land forces for their interdiction requirements.⁶³

Further, even when Colonel Shulte could convince the DCINC to weigh in for the land forces, the Air Force adhered only to the letter, not the spirit of the DCINC's directives. For example, the DCINC chaired a joint targeting meeting held on 3 February 1991, in response to pressure exerted by Colonel Shulte, to address land force grievances with the JFACC's operating procedures. After this meeting, given a directive to begin attacking more land force nominated interdiction targets by the DCINC, the Air Force began demanding that all land force operational level interdiction target submissions be accurate within 100 meters. This requirement proved practically

impossible to meet and attack of land force nominated interdiction targets decreased as a result.⁶⁴

Lieutenant General Franks, commander of the Army's VIIth Corps, attempted to make the best of the situation. VIIth Corps headquarters routinely communicated with the Air Force's Airborne Command and Control Center (ABCCC) platform to request attack of operational level interdiction targets in front of the Corps by aircraft diverted from other missions. In this inefficient manner, VIIth Corps attempted to prepare the battlefield before launching its attack.⁶⁵ Eventually, awareness of the lack of synchronization between land and air forces reached Schwarzkopf.

Despite the patchwork attempt at mending the synchronization problem with a joint targeting meeting, it became obvious to the CINC that land and air force synchronization was not occurring. On 5 February 1991, the first meeting of a joint targeting coordination board convened with the intent of synchronizing land and air operations. However, the meeting was chaired by the JFACC, and again, because the CINC was acting as the land component commander and did not attend the meeting, no unified voice represented the land forces. Moreover, no land force representative that attended the meeting was of equal rank to the JFACC, Schulte believed this allowed the JFACC to dominate the agenda.⁶⁶

This joint targeting coordination board concept is inferior to the present doctrine and organization. At worst, the current doctrine and organization allows for development and execution of separate, yet internally synchronized, land and air operations. Attempting to resolve differences between the services in a joint targeting coordination board, where each service is attempting to gain control over additional assets to improve its own plan, serves only to sub-optimize one, and possibly both plans. Synchronization

cannot occur after development of plans in isolation. Further, if a neutral party who was not in on the development of either plan chairs the board, decisions will result without a thorough understanding of the rationale driving the development of the respective plans. Attempted solutions of this type, result in compromise and not joint synchronization.

Another factor contributing to the lack of synchronization was the Air Force's ATO development and execution cycle. The ATO process directs planning and packaging of aircraft for selected targets. The ATO procedure carried out in Desert Storm worked on a 96 hour cycle. Development of a Master Attack Plan (MAP) occurred 96 hours out from target attack. This attack plan served to give initial visibility to a target based on the JFC's established priorities. Targets entered on the MAP were continually updated and target location refined. Forty-eight to twenty-four hours from target engagement the AOC built the ATO for the next day. ATO dissemination occurred 24 hours from execution. The Air Force used this centralized, unresponsive system due to the number of aircraft in the theater, more than 1,200, to ensure safe and effective control and coordination.⁶⁷

An ATO system designed and executed like the one used in Desert Storm functions well for attack of strategic targets. It also works well for relatively stationary operational level targets. However, its utility begins to breakdown when matched against mobile operational targets such as formations of armored units. Attacks planned against these mobile type targets, even as little as 24 hours in advance, are unlikely to succeed. Against tactical level targets chances of success diminish even further. The ABCCC alleviates some of the inflexibility of the ATO cycle by diverting and controlling aircraft against targets of opportunity. However, the ABCCC contributes nothing to the synchronization planning process.

Appreciation of the new capabilities of the respective land and air components appeared at the beginning of the air campaign, but faded quickly. A striking example serves to illustrate current doctrinal weakness as measured against the third evaluation criterion. On 17 January 1991, Lieutenant Colonel Dick Cody led an Apache helicopter task force into Iraq. Its assigned mission, was to attack and destroy an Iraqi radar site positioned along the flight path of the F-117s headed for Baghdad. The task force destroyed successfully the Iraqi radar site providing a safe route for the Air Force's F-117s attack.⁶⁸ This example demonstrates the use of Army assets to perform what the Air Force calls Offensive Counterair. Moreover, it demonstrated the successful linkage of tactical and operational level effects by showing how land forces could support interdiction operations. However, after this successful operation, planners did not attempt to synchronize the Apaches all-weather, twenty-four hour capabilities with additional Air Force missions.

SECTION 5

Doctrinal Effectiveness Evaluated

Measured against the previously determined criteria for success, the synchronization doctrine and organization employed in Desert Storm failed. The first standard, met in theory but not practice, was the collocation of operational land and air headquarters. The JFACC's AOC located with the land component commander's headquarters, General Schwarzkopf, although dual-hatted as the land component commander, Schwarzkopf did not function as such. Nominally, Third Army was planning the Army operational level plan and the BCE worked for Lieutenant General Yeosock. Therefore, there was no joint planning conducted and little if any consultation with, or consideration of land force operational level interdiction requirements.⁶⁹ Contributing to

this situation was the Army's inability to demonstrate to the CINC how operations conducted at the tactical level, in this case corps and below, could have operational level effects.

Measured against the second criterion, the structure of the air organization supported the requirement to achieve air superiority. However, the structure and ATO aircraft control process proved less than responsive given the fluid nature of the battlefield. Considering the number of aircraft and the time available, the ATO process worked well for engaging static targets. Although the Air Force can divert aircraft in response to detection of targets of opportunity, this is a reactive versus proactive capability and surrenders initiative to the enemy. It does not provide the ability to synchronize land and air force effects at the operational level even nearly simultaneously.

Finally, the design of current doctrine, rather than acknowledging and leveraging the new capabilities demonstrated by land and air forces, ensures equal but separate employment of assets. Despite demonstrating results attained through synchronization of the functional abilities of the two services, commanders of land and air forces in Desert Storm chose to employ their assets separately. Commanders recognized that the organization designed to implement the ATO process, and the process itself, were incapable of synchronizing Air Force fixed-wing and Army rotary-wing aircraft. Control of 1,200 Air Force fixed wing aircraft required daily, a 300 page ATO document. In the last five days of the war, more than 9000 helicopter sorties were flown.⁷⁰ Adding those flights to the ATO and attempting to control them under the current system would prove impossible. More seriously, any attempt to add helicopters to the ATO would negate their effectiveness by limiting their use by the land force commander. Evaluated by the

established criteria for effectiveness, current synchronization doctrine fails and prevents the Army from achieving its aim to attack the enemy in depth and simultaneously.

Our current joint doctrine is inadequate because it only establishes requirements for coordination and consultation between air and land components. Further, it does not provide for the ability to concentrate and synchronize rapidly land and air combat force effects. In fact, it purposely divides the battlefield between tactical and operational levels, creating an exploitable seam, based on an obsolete land and air force functional capability paradigm. Moreover, it discourages the synchronized employment of complimentary service assets by fostering a joint environment that views new capabilities as an encroachment on historical roles and missions. To enable the Army to achieve its goal of attacking the enemy simultaneously throughout the depth of his formation, joint doctrine must reconcile or adapt to the distinctly different views of the battlefield held by the Army and Air Force.

Air Force and Army Views of the Battlefield

The Air Force view of the battlefield uses a framework that divides the battlefield environment into four distinct areas. These areas, according to the Air Force, are sufficiently different in environmental and operational characteristics to merit separate identities and treatment. The four areas include the rear battle, close battle, deep battle, and high battle. Air Force thinking about the battlefield is systematic, in keeping with its approach to warfighting. Use of the framework, again according to the Air Force, prevents redundancies in the development of weapons systems capable of crossing the boundaries established on the battlefield.⁷¹

To the Air Force, boundary management is the most critical aspect of joint warfighting. Placement of the lines defining the rear, close, deep, and high battles is the

priority task of the JFC. The objectives of each component are no more than supporting objectives in the context of the overall objective of the JFC. No component should be able to subordinate another component's operational activity without the cognizant approval of the JFC.⁷²

Finally, the Air Force argues that the strength of America's armed forces grows from the ability to employ separately developed, highly specialized forces in unified action. The *economy of synergy* is the desired effect, and it depends on solid core competencies in the land, sea, and air mediums for warfare employed under strong unified command. This intellectual and physical battlefield construct enables the development of any desired level of redundancy and/or competition within or across specific missions. The Air Force view of the battlefield differs significantly with that of the Army.⁷³

The Army views the battlefield of the future as one that has no boundaries or seams. This vision relies on the development of digitized communication systems that provide all members of the force a shared situational awareness of the battlefield. Inherently, this vision provides for the fielding of more effective combat forces. An organization that has no seams or connecting points and is not concerned with boundaries presents no weak points to an enemy for possible exploitation.⁷⁴ Extension of this perspective of the battlefield and its associated technical capabilities beyond current service lines will result in a truly joint organization and doctrine.

A shared, common relevant picture between land and air forces will allow for the elimination of boundaries and fire control measures like the FSCL. This new operating environment will create the opportunity to eliminate cumbersome command and control procedures like the ATO process. Coupled with a doctrine and organization designed to

conduct joint land and air force planning and execution, this new operating environment will allow for simultaneous attack of the enemy in depth.

Alternative Joint Synchronization Doctrine and Organization

The current land and air synchronization doctrine is based on centralized control of air assets, usually by a JFACC who is responsible for achieving the JFC's objective for air forces, while coordinating and consulting with the land component commander.

Development of an improved joint synchronization doctrine and organization depends on the answer to two questions and how joint doctrine can adapt to the Army and Air Force's contradictory views of the battlefield. First, what effect does centralized control of air assets by an air component commander have on the land component commander's ability to attack the enemy in depth and simultaneously? Second, what are the implications for joint synchronization between land and air forces in an operating environment typified by a shared, common situational awareness across service lines?

As previously discussed, the land component commander has responsibility, according to current joint doctrine, to synchronize operations within his assigned area of operations. Concentrating control of all air assets under the air component commander interferes with the land component commander's ability to focus and mass air power. Moreover, only allowing the land component commander to nominate operational level interdiction targets that appear inside his AO to the air component commander, restricts the land component commander's ability to synchronize effects within his assigned AO. While all nominated targets may be attacked, without control over the air assets apportioned to him, the land component commander is unable to achieve the aims of Army doctrine within his assigned AO. Conversely, the air component commander knows best how to employ air assets to achieve maximum effectiveness from available weapon

systems. Joint doctrine is needed to reconcile the land component commander's requirement to synchronize effects in his assigned AO and the air component commander's acknowledged expertise in employment of air assets while maintaining centralized control.

The Army must extend the technology that will provide all Army forces with a shared, common situational awareness of the battlefield to include Air Force weapon systems. In fact, achieving the Army's aim of simultaneous and in depth attack demands shared, common situational awareness between the Army and Air Force. TRADOC PAM 525-200-5 states:

The concept of depth and simultaneous attack is based on the application of joint and combined combat power. For this reason, the concept must be coordinated with other services and with our allies. This is necessary not only to reach a consensus on the relative merit of the concept but also to establish the detailed procedures needed for its planning and execution. The extent to which this concept can be applied is based on the degree of planning and coordination conducted with other services and allies.⁷⁵

Shared, common situational awareness between the Army and Air Force could eliminate the requirement for fire control measures and boundaries, as we know them today, within the land component commander's AO. This approach should allow land and air component commanders to synchronize their operations. While this would not remove the requirement for positive control of air assets, it would allow for a significantly compressed ATO cycle or a different system of control. Moreover, an environment such as this increases the advantages of centralized control of air assets, responsiveness and flexibility.

Given a joint planning doctrine and a supporting organizational structure in an AO without restrictions, the land component commander would have the ability and tools necessary to synchronize land and air force effects within his AO. More important, the

resulting elimination of seams (separately developed plans, boundaries, and fire support coordination measures) removes an exploitable friendly vulnerability. This recommended strategy does not require the Air Force to alter its view of the battlefield. The JFC can plan and implement his campaign priorities by controlling the size of the land component commander's AO. Combined with his apportionment decision, the JFC can also expand or contract the number of Air Force weapon systems responding to the land component commander. This allows the Air Force to employ air assets according to its compartmentalized view of the battlefield while eliminating seams within the land component commander's AO and enabling him to attack enemy forces in depth and simultaneously.

SECTION 6

Recommendation

A requirement to develop and implement alternatives to land and air force synchronization doctrine exists considering the previously established criteria. Any effective alternative must provide for joint planning and execution, achieving air superiority while retaining the ability to synchronize land and air force effects, and simultaneously taking advantage of each services unique capabilities. One solution lies in integrating centralized and organic control.

Joint doctrine should retain the concept of centralizing control of air assets under a JFACC. Additionally, JFACCs should retain control of all theater air assets. However, control of those air assets supporting the land component commander's operation in his assigned AO, based on the JFC's apportionment decision, should be decentralized. That is, the JFACC would execute the JFC's guidance for strategic air operations and be the theater air commander. Simultaneously, while not necessarily collocated (due to shared,

common situational awareness) the land and air component commander would plan and execute jointly, operational level interdiction synchronized with land maneuver force operations. This means that the land component commander would not nominate targets or consult with the air component commander regarding the land force requirements for air assets. Rather, it would provide the land component commander the ability to determine timing, priority, and effects of fires and air delivered interdiction within his AO. Adoption of this doctrine and resulting organization would rectify the weaknesses inherent in the current system.

Elimination of the conceptual seam and inherent vulnerability created by the doctrine of consultation and coordination would negate the requirement for the BCE. While recognizing the need to maintain physical liaison between headquarters, there would be no requirement for an organization designed to facilitate coordination. However, an effective joint doctrine and organization requires collocation of land and air component headquarters, at a minimum planning cells, in the absence of assured communication and common situational awareness.

The JFACC functions as the theater air commander and remains the supported commander for interdiction outside the land component commander's AO. Just as the JFC apportions air assets for use inside the land component commander's AO, he could also apportion land assets, including rotary-wing and ATACMS missiles for use outside the land component AO, in support of the air component commander's operations. Additionally, the JFC establishes the size of the land component commander's AO based on his vision for the employment of land forces, their mission, and size.

It is not inconceivable that the JFC would, by sizing the land force AO, restrict the land force commander to tactical level operations while making the JFACC the supported

commander responsible for synchronizing operational level actions. This would likely be the case during early entry operations conducted by a force projection army, when the preponderance of weapons systems in theater belong to the air component. Conversely, as land forces built-up in theater, the land component commander would become the supported commander with a corresponding expansion of his AO, including responsibility for synchronizing both tactical and operational level actions.

Finally, jointly developed plans allow the land component commander the ability to attack the enemy within his AO simultaneously and in depth. Moreover, it emulates the command structure proven successful in Europe during WWII while incorporating new technological capabilities. Further, it is an adaptable doctrine, executable by a force projection military while maintaining unity of effort and command.

Possibly, the Air Force would object to this proposed alternative. The Air Force, historically, has been responsible for executing the operational and strategic fights in a given theater. Increasingly, the Army is capable of fighting the tactical fight while extending its ability to affect the operational level of war. Parochialism aside, this proposed alternative would ensure achievement of engaging the enemy in depth and simultaneously throughout a theater of operations.

Conclusion

Over the past decade the Army and Air Force have continued their evolutionary development of joint synchronization doctrine. The process is inhibited by concerns over which service will have responsibility for synchronization and control over the attack of operational level interdiction targets. Joint doctrine acknowledges the modern context and nature of war. All elements of the US military are interdependent and success on the modern battlefield demands facing conflicts with a joint, synchronized team.

Increasingly, the Army has improved its ability to acquire and engage enemy forces at increased ranges. This ability, coupled with the publication of FM 100-5 Operations and the Army's increased interest in the operational level of war creates the question of who should be responsible for planning, targeting, delivering and integrating effects of operational level weapons systems within the land component commander's AO. This newly developed Army ability to affect the battlefield at the operational level of war, has increased the importance of developing a joint synchronization doctrine that capitalizes on the functional capabilities of the Army and Air Force. The penultimate joint doctrine will synchronize fully the effects of land and air forces.

Developing effective joint doctrine requires a standard by which to measure success. This study evaluated a successful joint operation conducted during WWII, "Operation Cobra," and determined that effectiveness of joint land and air operations resulted from a doctrine and organization that organized around three criteria. These criteria included: collocated land and air force operational level headquarters; an organization and doctrine designed to gain air superiority while maintaining the ability to concentrate and synchronize rapidly land and air forces effects; and a cooperation and mutual appreciation for the capabilities of the respective land and air components. Effectiveness of current joint synchronization doctrine, as executed in Operation Desert Storm, was measured against these three criteria and was found wanting.

Current joint doctrine designates the land component commander as the supported commander within his JFC assigned AO. Synchronization of operations conducted within the land AO is the responsibility of the land component commander. While joint doctrine assigns synchronization responsibility to the land component commander in his assigned AO it does not provide the tools or organization necessary for

the successful execution of that responsibility. Currently, joint synchronization at the operational level within the land component commander's AO consists of the land component commander consulting with the air component commander regarding the employment of air assets. The land component commander has no effective control over air assets employed in his assigned AO despite having synchronization responsibility assigned by joint doctrine. Additionally, no joint planning occurs between the land and air component commanders resulting in an inability to attack enemy forces simultaneously throughout their depth. At best, current doctrine results in the development and execution of two disparate plans, land and air. At worst, it produces operations, that through a series of compromises, leads to the suboptimization of two separate plans previously synchronized internally.

This study recommends the development of a joint doctrine and organization that incorporates joint planning and execution at the operational level between the land and air forces. This recommended joint doctrine and organization may include collocated land and air force headquarters, or given assured communication and shared common situational awareness a process that results in an operational plan, jointly developed and executed. Jointly developed and executed plans will eliminate the seam and inherent weakness involved with the current doctrine of consultation and coordination exercised through the BCE. Implementation of this recommendation would satisfy the criteria for successful synchronization of land and air operations and produce a joint team capable of engaging enemy forces in depth and simultaneously, with the resultant effect of decisive defeat of any opponent.

ENDNOTES

1. Barry Goldwater, and Sam Nunn, "Defense Organization: The Need for Change, Senate Floor Speeches," in Armed Forces Journal International (October 1985): 3-38.
2. Joint Chiefs of Staff, Joint Pub 3-0, Doctrine for Joint Operations (Washington, D.C.: US Government Printing Office, 1993): I-1.
3. Joint Chiefs of Staff, Joint Pub 1, Joint Warfare of the US Armed Forces (Washington, D.C.: US Government Printing Office, 1991): iii.
4. Department of the Army, TRADOC PAM 525-200-5, Depth and Simultaneous Attack (Fort Monroe, VA.: Training and Doctrine Command, 1994): 2.
5. Department of the Army, FM 100-5, Operations (Washington, D.C.: US Government Printing Office, 1993): 2-7.
6. Chris Bellamy, Red God of War: Soviet Artillery and Rocket Forces (Washington, D.C.: Brassey's Defence Publishers, 1986): 45.
7. Richard R. Simpkin, Deep Battle: The Brainchild of Marshall Tukhachevskii (London: Brassey's Defense Publisher, 1987): 180.
8. Joint Chiefs of Staff, Joint Pub 3-03, Joint Interdiction Operations (Washington, D.C.: US Government Printing Office, 1990): III-2.
9. Ibid., III-2.
10. Department of the Air Force, AFM 1-1, Basic Aerospace Doctrine of the United States Air Force, Vol. I & II (Washington, D.C.: US Government Printing Office, 1992): 12-13.
11. Department of the Army, FM 100-5, Operations, p. 6-12.
12. Department of the Army, TRADOC PAM 525-200-4, Mounted Battlespace (Fort Monroe, VA.: Training and Doctrine Command, 1994): 3.
13. TRADOC PAM 525-200-5, Depth and Simultaneous Attack, p. 2.
14. General Gordon R. Sullivan and Lieutenant Colonel Anthony M. Coroalles, "Seeing the Elephant: Change and America's Army" (Washington, D.C.: Office of the Chief of Staff, US Army, 1994): 18.
15. Richard Kohn and Joseph P. Harchan, ed., Air Power: Air Superiority in World War II and Korea (Washington, D.C.: Office of Air Force History, 1983): 6.
16. Stephen J. Mcnamara, "Air Power's Gordian Knot: Centralized Versus Organic Control" (Maxwell Air Force Base, AL: Air University Press, 1994): 12.

17. Department of the Army, FM 1-5, Employment of Aviation of the Army (Washington, D.C.: US Government Printing Office, 1940).
18. Department of the Army, FM 31-35, Aviation in Support of Ground Forces (Washington, D.C.: US Government Printing Office, 1940).
19. William Moymer W., Air Power in Three Wars (Washington, D.C.: Department of the Air Force, 1978): 163.
20. Ibid., 256.
21. Ibid., 256.
22. Army Air Forces Historical Studies: No. 30., Ninth Air Force Participation in the Desert Campaign to January 1943 (Assistant Chief of Air Staff, Historical Division, 1945): 8.
23. Moymer, Air Power, p. 42.
24. Ibid., p. 42.
25. Arthur Tedder, Marshal of the Royal Air Force, With Prejudice (Boston, MA: Little, Brown and Company, 1956): 391.
26. Moymer, Air Power, p. 30.
27. Tedder, With Prejudice, p. 397.
28. Moymer, Air Power, p. 256.
29. Ibid., p. 256.
30. Kohn, Air Superiority, p. 35.
31. Moymer, Air Power, p. 45.
32. Kent Roberts Greenfield, Army Ground Forces and the Air-Ground Battle Team, Study No. 35 (Fort Monroe: Army Field Forces, 1948): 47.
33. Greenfield, Study No. 35, p. 48.
34. Ibid., p. 48.
35. Ibid., p. 48.
36. Department of the Army, FM 100-20, Command and Employment of Air Power (Washington, D.C.: War Department, 1943): 1-11.
37. Bernard Montgomery, Some Notes for Senior Officers on the Conduct of Battle (Tripoli: Headquarters Eighth British Army, 1943): 29.

38. Theater General Board, Air Power in the European theater of Operations, Study No. 56 (US Air Forces: European Theater, 1945): 14.
39. Richard P. Hallion, Strike from the Sky: The History of Battlefield Air Attack, 1911-1945 (Washington, D.C.: Smithsonian Institution Press, 1989): 193.
40. McNamara, "Air Power's Gordian Knot," p. 33-35.
41. Department of the Army, United States Army in World War II Special Studies: Chronology 1941-1945 (Washington, D.C.: Office of the Chief of Military History, 1960): 232.
42. Russell F. Weigley, Eisenhower's Lieutenants: The Campaign of France and Germany 1944-1945 (Bloomington: Indiana University Press, 1981): 144-160.
43. Ibid., p. 149-151.
44. Ibid., p. 152.
45. Ibid., p. 171.
46. Sterling R. Richardson, "The Normandy campaign: Firepower at the Operational Level," (Fort Leavenworth, KS: Command and General Staff College, School for Advanced Military Studies, 1987): 22.
47. Wesley Craven and James Cate, ed., The Army Air Forces in World War II: Europe. Argument to V-E Day (Chicago: University of Chicago Press, 1951): p. 805.
48. Joint Pub 3-03T, Joint Interdiction Operations, p. I-1.
49. Ibid., p. II-2.
50. Joint Pub 3-0, Doctrine for Joint Operations, p. II-8.
51. Joint Pub 3-03T, Joint Interdiction Operations, p. IV-4.
52. Joint Pub 3-0. Doctrine for Joint Operations, p. IV-22.
53. Ibid., p. IV-22.
54. Ibid., p. IV-22.
55. Department of the Air Force, "Battlefield Coordination Element: LNA 3HB," (Hurlburt Field, FL: US Air Force Air Ground Operations School, 1994): 2-5.
56. Ibid., p. 2.
57. Ibid., p. 1-55.
58. Department of the Air Force, "Battlefield Coordination Element: LNA 3HB," p. 18.

59. Robert H. Scales, Brigadier General, Certain Victory: The US Army in the Gulf War, (Washington, D.C.: Office of the Chief of Staff United States Army, 1993): 46-60.
60. David Shulte, Colonel, 1st Battlefield Coordination Detachment, "Desert Shield/Desert Storm After-Action Review," (Riyadh, Saudi Arabia: 1st BCE, 1991): 25.
61. Calvin Waller, Lieutenant General, Combined Arms Command Interview, "Observations of Desert Storm," (Fort Leavenworth, KS: Headquarters, Combined Arms Command, 1991): 3.
62. Michael R. Gordon, and General Bernard E. Trainor, The General's War: The Inside Story of the Conflict in the Gulf, (Boston, MA: Little, Brown and Company, 1995): 125.
63. Shulte, "1st BCE," p. 15.
64. Ibid., p. 27.
65. Ibid., p. 23.
66. Ibid., p. 29.
67. Department of the Air Force, "JFACC Primer," (Washington, D.C.: Headquarters, United States Air Force, Deputy Chief of Staff, Plans and Operations, 1994): 26.
68. Gordon, The General's War, p. 205-206.
69. Shulte, "1st BCE," p. 9.
70. Royal N. Moore Jr., Lieutenant General, "Marine Air: There When Needed," (US Naval Institute Proceedings 117, no. 11 November, 1991): 63-70.
71. Department of the Air Force, "An Introduction to the Air Force Perspective on Roles and Missions," (Washington, D.C.: Headquarter, United States Air Force, Deputy Chief of Staff, Plans and Operations, 1995): 4.
72. Ibid., p. 4.
73. Ibid., p. 5.
74. Department of the Army, TRADOC PAM 525-5, Force XXI Operations: A Concept for the Evolution of Full-Dimensional Operations for the Strategic Army of the Early Twenty-First Century, (Fort Monroe, VA: Training and Doctrine Command, 1994): 3-4.
75. TRADOC PAM 525-200-5, Depth and Simultaneous Attack, p. 2.

BIBLIOGRAPHY

BOOKS

- Bellamy, Chris. Red God of War: Soviet Artillery and Rocket Forces. Washington, D.C.: Brassey's Defense Publishers, 1986.
- Blumenson, Martin. U.S. Army in World War II. Breakout and Pursuit. Washington, D.C.: Office of the Chief of Military History, 1961.
- Craven, Wesley and James Cate, ed. The Army Air Forces in World War II: Europe. Argument to V-E Day. Chicago: University of Chicago Press, 1951.
- Hallion, Richard P. Strike from the Sky: The History of Battlefield Air Attack, 1911-1945. Washington, D.C.: Smithsonian Institution Press, 1989.
- Gordon, Michael R. and General Bernard E. Trainor. The General's War: The Inside Story of the Conflict in the Gulf. Boston, MA: Little, Brown and Company, 1995.
- Keaney, Thomas A. and Eliot A. Cohen. Gulf War Air Power Survey: Summary Report. Washington, D.C.: U.S. Government Printing Office, 1993.
- Kohn, Richard H. and Joseph P. Harahan. Air Power: Air Superiority in World War II and Korea. Washington, D.C.: Office of Air Force History, 1983.
- MacIsaac, David. "Voices from the Central Blue: The Air Power Theorists." in Makers of Modern Strategy, ed. Peter Paret, 624-647. Princeton: Press, 1986.
- McNamara, Stephen J. Air Power's Gordian Knot: Centralized Versus Organic Control. Maxwell Air Force Base, AL: Air University Press, 1994.
- Moymer, William W., Air Power in Three Wars. Washington, D.C.: Department of the Air Force, 1978.
- Scales, Robert H. Certain Victory: The U.S. Army in The Gulf War. Washington, D.C.: Office of the Chief of Military History, 1993.
- Simpkin, Richard. Deep Battle: The Brainchild of Marshal Tukhachevskii. Washington, D.C.: Brassey's Defense Publishers, 1987.
- Tedder, Arthur, Marshal of the Royal Air Force. With Prejudice. Boston, MA: Little, Brown and Company, 1956.
- Weigley, Russell F. Eisenhower's Lieutenants: The Campaign of France and Germany 1944-1945. Bloomington: Indiana University Press, 1981.

MANUALS

Department of the Air Force, AFM 1-1, Basic Aerospace Doctrine of the United States Air Force, Vol. I & II. Washington, D.C.: U.S. Government Printing Office, 1992.

Department of the Air Force, "Battlefield Coordination Element: LNA 3HB." Hurlburt Field, FL: U.S. Air Force Air Ground Operations School, 1994.

Department of the Air Force, "JFACC Primer." Washington, D.C.: Headquarters, United States Air Force, Deputy Chief of Staff, Plans and Operations, 1994.

Department of the Air Force, "An Introduction to the Air Force Perspective on Roles and Missions." Washington, D.C.: Headquarters, United States Air Force, Deputy Chief of Staff, Plans and Operations, 1995.

Department of the Army, FM 1-5, Employment of Aviation of the Army. Washington, D.C.: U.S. Government Printing Office, 1940.

Department of the Army, FM 31-35, Aviation in Support of Ground Forces. Washington, D.C.: U.S. Government Printing Office, 1940.

Department of the Army, FM 6-20, Fire Support in the Airland Battle. Washington, D.C.: U.S. Government Printing Office, 1988.

Department of the Army, FM 6-20-10, The Targeting Process. Washington, D.C.: U.S. Government Printing Office, 1990.

Department of the Army, FM 6-121, Field Artillery Target Acquisition. Washington, D.C.: U.S. Government Printing Office, 1990.

Department of the Army, FM 90-1, JAAT: Multi-Service Procedures for Joint Attack Team Operations. Washington, D.C.: U.S. Government Printing

Department of the Army, FM 90-15, J-SEAD: Multi-Service Procedures for the Joint Suppression of Enemy Air Defense. Washington, D.C.: U.S. Government Office, 1990.

Department of the Army, FM 90-24, C³CM: Multi-Service Procedures for Command, Control, and Communications Countermeasures. Washington, D.C.: U.S. Government Printing Office, 1991.

Department of the Army, FM 90-28, J-Fire: Multi-Service Procedures for the Joint Application of Firepower. Washington, D.C.: U.S. Government Office, 1989.

Department of the Army, FM 90-28, Tactical Air Planning and Employment in Support of Ground Operations. Washington, D.C.: U.S. Government Printing Office, 1991.

Department of the Army, FM 100-5, Operations. Washington, D.C.: U.S. Government Printing Office, 1993.

Department of the Army, FM 100-5-1, Operational Terms and Symbols (Initial Draft). Washington, D.C.: U.S. Government Printing Office, 1994.

Department of the Army, FM 100-15, Corps Operations (Initial Draft). Washington, D.C.: U.S. Government Printing Office, 1994.

Department of the Army, FM 100-20, Command and Employment of Air Power. Washington, D.C.: War Department, 1943.

Department of the Army, FM 100-103, Army Airspace Command and Control in a Combat Zone. Washington, D.C.: U.S. Government Printing Office, 1987.

Department of the Army, TRADOC PAM 525-5, Force XXI Operations: A Concept for the Evolution of Full-Dimensional Operations for the Strategic Army of the Early Twenty-First Century. Fort Monore, VA: Training and Doctrine Command, 1994.

Department of the Army, TRADOC PAM 525-45, General Operating Procedures for Joint Attack of the Second Echelon (J-SAK). Washington, D.C.: U.S. Printing Office, 1984.

Department of the Army, TRADOC PAM 525-200-4, Mounted Battlespace. Fort Monroe, VA.: Training and Doctrine Command, 1994.

Department of the Army, TRADOC PAM 525-200-5, Depth and Simultaneous Attack. Fort Monroe, VA.: Training and Doctrine Command, 1994.

Joint Chiefs of Staff, JCS Pub. 3-0, Doctrine for Unified and Joint Operations. Washington, D.C.: U.S. Government Printing Office,

Joint Chiefs of Staff, JCS Pub. 3-03, Doctrine for Joint Interdiction Operations. Washington, D.C.: U.S. Government Printing Office, 1990.

Joint Chiefs of Staff, JCS Pub. 3-09, Doctrine for Joint Fire Support. Washington, D.C.: U.S. Government Printing Office,

Joint Chiefs of Staff, JCS Pub. 5-00.2, Joint Task Force (JTF) Planning Guidance and Procedures. Washington D.C.: U.S. Government Printing Office, 1988.

Periodicals

Doerfel, John S. "The Operational Art of the Airland Battle." *Military Review*, May 1982, 3 through 10.

Ellertson, LTC (USA) Jack W. and LTC (USAF) Alan K. Huffman. "Joint Precision

- Interdiction in the Post-CFE Environment." Military Review, July 1991. 45.
- Holder, LTC L.D. "Maneuver in the Deep Battle." Military Review, May 1982, 54-61.
- Moore, Royal N. Jr., Lieutenant General, "Marine Air: There When Needed." US Naval Institute in Proceedings 117, no. 11 November, 1991.
- Welch, LTC William G. "Joint Targeting Concept." AirLand Bulletin, No. 92-2, 30 June 1992, 7-10.

Government Documents and Studies

- Army Air Forces Historical Studies: No. 30. Ninth Air Force Participation in the Desert Campaign to January 1943. Assistant Chief of Air Staff, Historical Division, 1945.
- Center for Army Lessons Learned, Combat Training Centers (CTCs) Bulletin No. 94-1. Fort Leavenworth, KS: Center for Army Lessons Learned, 1994.
- Center for Army Lessons Learned, Bulletin No. 1-86. Fort Leavenworth, KS: Center for Army Lessons Learned, 1986.
- Department of the Army, "Memorandum for Commander, TRADOC: Program Directive for FM 100-13, Battlefield Coordination Element (BCE)." Fort OK: U.S. Army Field Artillery School, No date.
- Department of the Army, Table of Organization and Equipment No. 51002L0 (Battlefield Coordination Element). Washington D.C.: U.S. Government Printing Office, 1990.
- Frostic, Fred. Air Campaign Against the Iraqi Army in the Kuwaiti Theater of Operations. Santa Monica, CA: RAND Corporation, 1994.
- Greenfield, Kent Roberts. Army Ground Forces and the Air-Ground Battle Team, Study No. 35. Fort Monroe: Army Field Forces, 1948
- Shulte, David Colonel, 1st Battlefield Coordination Detachment, "Desert Shield/Desert Storm After-Action Review." Riyadh, Saudi Arabia: 1st BCE, 1991.
- Theater General Board. Air Power in the European theater of Operations, Study No. 56. U.S. Air Forces: European Theater, 1945.
- Waller, Calvin, Lieutenant General, Combined Arms Command Interview, "Observations of Desert Storm." Fort Leavenworth, KS: Headquarters, Combined Arms Command, 1991.

Unpublished Dissertations, Theses, and Papers

- Bronner, David E. "An Operational Level of War Fire Support Role for the Operational Level Commander." Carlisle Barracks, PA: U.S. Army War College, 1988.
- Dugan, Michael J. "Air Power--Concentration, Responsiveness and the Operational Art." Military Review, July 1989, 12-21.
- Eshelman, Mark J. "Air Commander Control of Army Deep Fire Assets." Fort Leavenworth, KS: Army Command and General Staff College. SAMS Monograph. 1993.
- Glantz, David. "Deep Attack; the Soviet Conduct of Operational Maneuver." Fort Leavenworth: Soviet Army Studies Office, 1987.
- McCabe, Richard L. "Counterair Operations in the Deep Attack: An Analysis of Feasibility." Fort Leavenworth, KS: Army Command and General Staff College. SAMS Monograph. 1988.
- Reece, Ralph G. "Operational Fires." Maxwell Air Force Base, AL: Air War College, 1989.
- Richardson, Sterling R. "The Normandy Campaign: Firepower at the Operational Level." Fort Leavenworth, KS: Command and General Staff College, School for Advanced Military Studies, 1987.
- Weafer, Thomas W. "The Challenge of Delivering Firepower at the Operational Level in AirLand Battle-Future." Fort Leavenworth, KS: Army Command and General Staff College. SAMS Monograph. 1991.
- Vernon, Michael H. "Air Interdiction: Joint Coordination Issues for the United States Army and Air Force Conducting Coalition Warfare Within the NATO Theater of Operations." Fort Leavenworth, KS: Army Command and General Staff College. SAMS Monograph. 1986.

Other Sources

- Armed Forces Staff College, AFSC Pub. 1., The Joint Staff Officer's Guide 1993. Norfolk, VA: National Defense University, 1993.
- Armed Forces Staff College, AFSC Pub. 2., Service Warfighting Philosophy and Synchronization of Joint Forces. Norfolk, VA: National Defense University, 1992.
- Battlefield Coordination Element (1st), "Tactical Standard Operating Procedure." Fort Bragg, NC: 1st BCE, 1993.

Department of the Army, United States Army in World War II Special Studies: Chronology 1941-1945. Washington, D.C.: Office of the Chief of Military History, 1960.

Gordon R. Sullivan, General and Lieutenant Colonel Anthony M. Coroalles, "Seeing the Elephant: Change and America's Army." Washington, D.C.: Office of the Chief of Staff, U.S. Army, 1994.

Montgomery, Bernard. Some Notes for Senior Officers on the Conduct of Battle. Tripoli: Headquarters Eighth British Army, 1943.

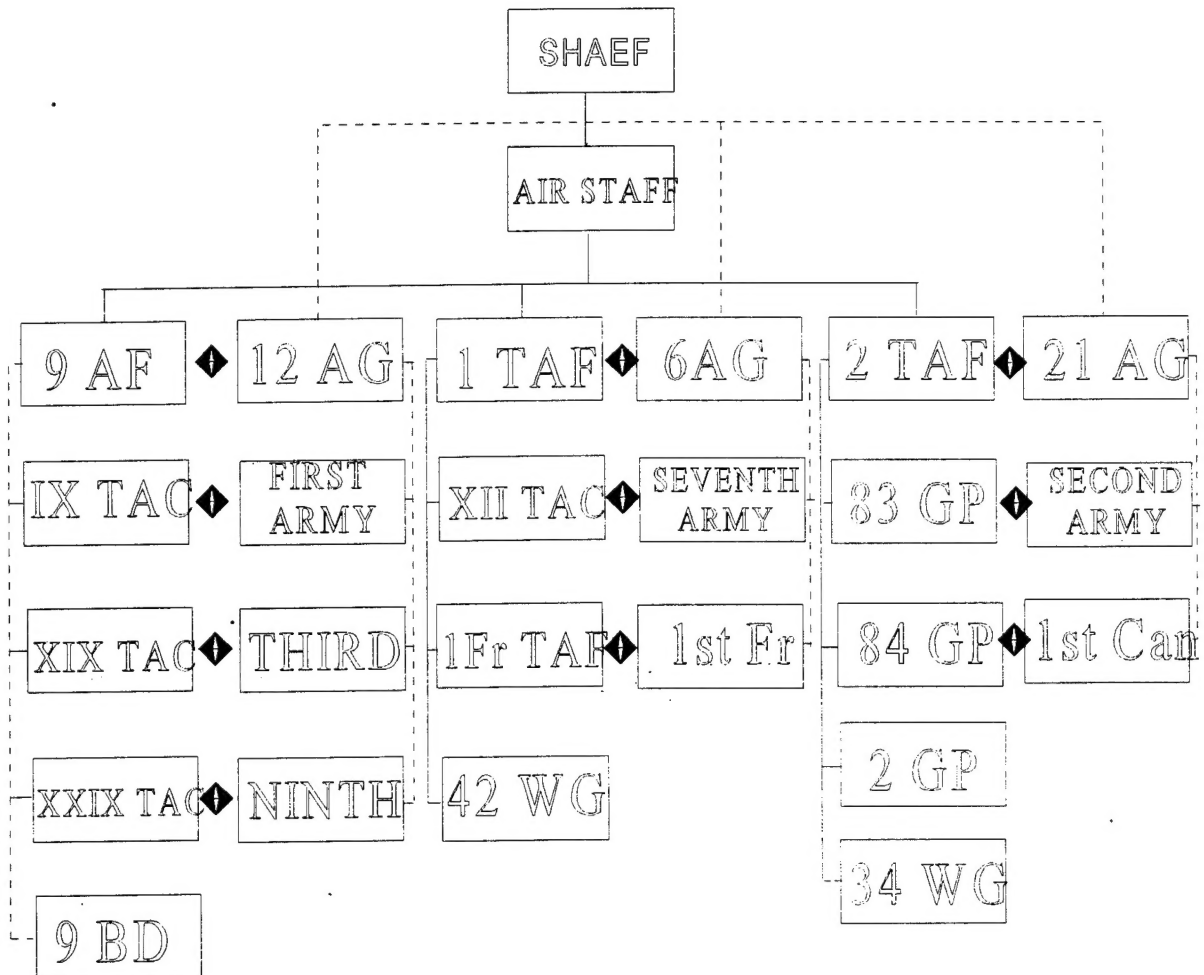
U.S. Army Battlefield Coordination Conference, "Minutes of Battlefield Coordination Element Conference." Hulbert Field, FL. 28-30 June 1994.

U.S. Army Battlefield Coordination Conference, "Minutes of Battlefield Coordination Element Conference." Fort Leavenworth, KS. 12-14 October 1994.

U.S. Air Force Air Ground Operations School, "Battlefield Coordination Element Lesson Plan." Hurlbert Field, FL: U.S. Air Force Air Ground Operations School, 1994.

Appendix A

Command and Control Structure of Army/Air Force Europe:1944

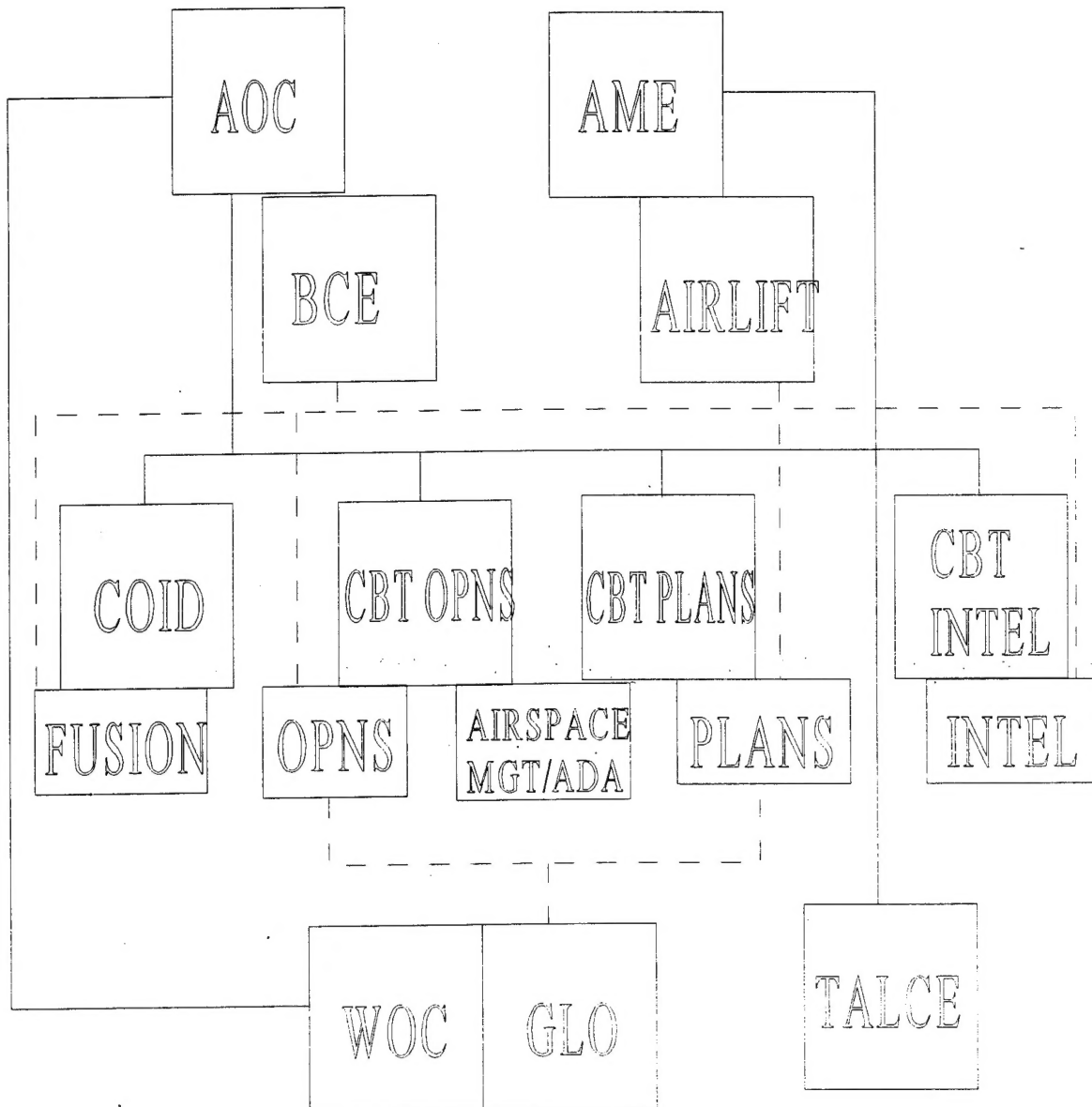


Legend: AF - Air Force AG - Army Group BD - Bombardment Division
 CAN - Canadian FR - French GP - Group (RAF)
 WG - Wing TAF - Tactical Air Force TAC - Tactical Air Command
 SHAEF - Supreme Headquarters Allied Expeditionary Forces

Source: Richard P. Hallion, Strike From the Sky: The History of Battlefield Air Attack, 1911-1945 (Washington, D.C.: Smithsonian Institution Press, 1989): 193.

Appendix B

BCE Integration with AOC



Source: Department of the Air Force, "Battlefield Coordination Center: LNA 3HB." Hurlburt Field, FL: U.S. Air Force Air Ground Operations School, 1994.

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